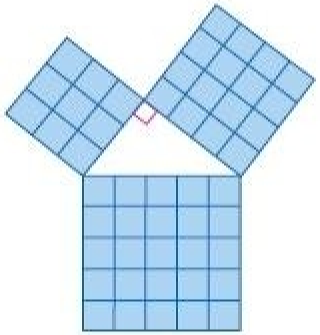
Explore 8-2 Geometry Lab: The Pythagorean Theorem



1. Use a ruler to measure a, b, and c. Do these measures confirm that $a^2 + b^2 = c^2$?

   SOLUTION:

   Yes; Using a ruler to measure a, b, and c, the Pythagorean Theorem $a^2 + b^2 = c^2$ is confirmed.

   ANSWER:
   Yes

2. Repeat the activity with different a and b values. What do you notice?

   SOLUTION:

   For any measures of a, b, and c, $a^2 + b^2 = c^2$.

   ANSWER:
   $a^2 + b^2 = c^2$

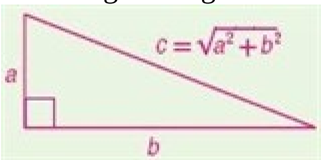
3. **WRITING IN MATH** Explain why the drawing is an illustration of the Pythagorean Theorem.

   SOLUTION:
   The diagram has a right triangle in the center. Each side is squared. The sum of the areas of the two smaller squares is equal to the area of the largest square.

   ANSWER:
   Sample answer: The sum of the areas of the two smaller squares is equal to the area of the largest square.

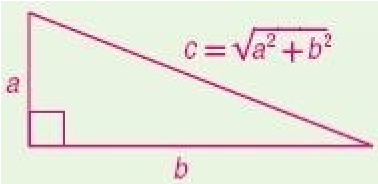
4. **CHALLENGE** Draw a geometric diagram to show that for any positive numbers a and b, $a + b > \sqrt{a^2 + b^2}$. Explain.

   SOLUTION:
   Draw a right triangle with legs a and b and hypotenuse c.



   In a right triangle $a < c$ and $b < c$, since the longest side is across from the 90° angle. Using the Pythagorean Theorem, $c = \sqrt{a^2 + b^2}$.
   By the Triangle Inequality Theorem, $a + b > c$. Since $c = \sqrt{a^2 + b^2}$, by substitution, $a + b > \sqrt{a^2 + b^2}$.

   ANSWER:



   By the Triangle Inequality Theorem, $a + b > c$. Since $c = \sqrt{a^2 + b^2}$, by substitution, $a + b > \sqrt{a^2 + b^2}$.